UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,142	06/01/2001	Eduardo Reck Miranda	450117-03311	1939

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EXAMINER
LAO, TIM P

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)	
Office Action Summary	09/872,142	MIRANDA, EDUARDO RECK	
	Examiner	Art Unit	
	Tim Lao	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>01 June 2001</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-27</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-5, 9-18, and 22-27</u> is/are rejected.

7)☒ Claim(s) <u>6-9 and 19-21</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>01 June 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5</u>.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1-5, 9-18, and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gasper et al. (U.S. Patent 5,278,943, hereinafter "Gasper") in view of Miranda ("Granular synthesis of sounds by means of a cellular automaton," 1995, hereinafter "Miranda")

Claim(s)	Gasper shows:
1	Voice synthesis apparatus comprising: a source module (e.g., voicing excitation library **548**) adapted to generate a raw sound signal (e.g., glottal pulses **544**) simulating the outcome from vibrations created by the glottis, (col.14, II.48-55, II.62-68) and a filter module (e.g. LPC filter) arranged to receive the raw sound signal (e.g., glottal pulses) produced by the source module and apply thereto a transfer function which simulates the response of the vocal tract; (col.4, II.53-63; col.14, II.7-16) Gasper does not show: the source module comprises means for generating a succession of sound granule signals to constitute said raw sound signal and means for controlling the spectrum of the sound granule signals according to states of cells of a cellular automaton. Miranda teaches:

	means for generating a succession of sound granule signals to constitute raw sound signal (p.297, col.1, 1st ¶, ll.1-4) and means for controlling the spectrum (e.g., sine waves with frequency, amplitude, and duration) of the sound granule signals according to states of cells of a cellular automaton. (p.298, Fig.1; col.2, 2nd ¶) It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the voice synthesis apparatus of Gasper to include the means of granular synthesis of sounds based on cellular automaton in order to generate a wide range of complex sounds (p.299, col.1, 1st ¶; p.297, col.1, 1st ¶, ll.6-10). Since the voice synthesis apparatus of Gasper provides means to add desired inflection to the sound or voice samples (see Abstract), the combination of the arts would provide high-quality synthesized sound or voices.
Claim(s) 2	<u>Gasper shows:</u> Voice synthesis apparatus according to claim 1, wherein the apparatus is adapted to generate ultra-linguistic utterances (e.g., infection). (see Abstract)
Claim(s) 3	<u>The combination of Gasper and Miranda shows:</u> Voice synthesis apparatus according to claim 1, wherein the sound granule signal spectrum controlling means is adapted to generate a sound granule signal (e.g., particle) by summing the signals (e.g., sine waves) produced by a plurality of signal generators (e.g., oscillators), the signal produced by each of the signal generators being dependent upon the state of one or more cells of the cellular automaton. (Miranda: p.298, col.3; Fig.1)
Claim(s) 4	<u>The combination of Gasper and Miranda shows:</u> Voice synthesis apparatus according to claim 3, and comprising means for designating, for each signal generator (e.g., oscil1, oscil2, ..., oscil9), one of a plurality of different waveforms (e.g., sine waves) to be output. (Miranda: p.298, Fig.1)
Claim(s) 5	<u>The combination of Gasper and Miranda shows:</u>

	Voice synthesis apparatus according to claim 3, wherein the sound granule signal spectrum controlling means comprises means for setting the number of signal generators (e.g., oscillators) used for production of the sound granule signal spectrum to one of a plurality of different possible values (e.g., 9). (Miranda: p.298, col.2, last 5 lines)
Claim(s) 9	The combination of Gasper and Miranda shows: Voice synthesis apparatus according to claim 1, wherein the cells of the cellular automaton can take states corresponding to integer values from 0 to x-1 and, at each cycle in the evolution of the cellular automaton, the state of each cell is updated dependent upon the states of the nearest neighbors of said cell according to the following algorithm: $$m^{t+1} = int(A/r_1) + int(B/r_2) \qquad if\ m^t = 0$$ $$m^{t+1} = int((S/A) + k) \qquad if\ 0 < m^t < x\text{-}1$$ $$m^{t+1} = 0 \qquad if\ m^t = x\text{-}1$$ where m^{t+1} is the cell state at a time period t+1 (after updating), m^t is the cell state at time t (before updating), A and B represent, respectively, the number of cells taking state value x-1 and state values in the range 1 to x-2 amongst the eight nearest neighbors of this cell, S represents the sum of the nearest neighbors' states, r_1 and r_2 represent the cell's resistance to an increase in state value and k controls the rate of increase of state value. (Miranda: see p.298, col.1, "The Algorithm" section). {m^t is equivalent to cell(n)$_t$, m^{t+1} eq. cell(n)$_{t+1}$, A eq. Pcells(n), B eq. Bcells(n), S eq. Pdegree(n)}
Claim(s) 10	The combination of Gasper and Miranda shows: Voice synthesis apparatus according to claim 9, wherein the sound granule signal spectrum controlling means comprises means for setting each of the parameters r_1, r_2 (resistances) and k (capacitances) to a respective one of a plurality of different possible values. (Miranda: p.298, col.1, ll.3-11; col.2, last 5 lines; col.3, ll.1-2)
Claim(s) 11	The combination of Gasper and Miranda shows: Voice synthesis apparatus according to claim 1, wherein the sound granule signal

	spectrum controlling means comprises means for setting the dimensions of the cellular automaton (dimension of the grid) to one of a plurality of different possible values. (Miranda: p.298, col.1, ll.3-11; col.2, last 5 lines)
Claim(s) 12	<u>The combination of Gasper and Miranda shows:</u> Voice synthesis apparatus according to claim 1, wherein the sound granule signal spectrum controlling means comprises means for setting the number of states (n) that can be assigned to the cells of the cellular automaton to one of a plurality of different possible values. (Miranda: p.298, col.1, ll.3-5)
Claim(s) 13	<u>The combination of Gasper and Miranda shows:</u> Voice synthesis apparatus according to claim 1, wherein the sound granule signal spectrum controlling means comprises means for setting the duration of the individual sound granules to one of a plurality of different possible values. (Miranda: p.298, col.3, ll.10-15) *{The duration is set by the number of iterations.}*
Claim(s) 14	<u>The combination of Gasper and Miranda shows:</u> Voice synthesis apparatus according to claim 1, wherein the sound granule signal spectrum controlling means comprises means for setting the total number of sound granules (i.e., number of iterations) making up the raw sound signal to one of a plurality of different possible values. (Miranda: p.298, col.3, 1st ¶)
Claim(s) 15	<u>Gasper shows:</u> A method of voice synthesis comprising the steps of: providing a source module (e.g., voicing excitation library **548**) adapted to generate a raw sound signal (e.g., glottal pulses **544**) simulating the outcome from vibrations created by the glottis, (col.14, ll.48-55, ll.62-68) and providing a filter module (e.g. LPC filter) arranged to receive the raw sound signal (e.g., glottal pulses) produced by the source module and apply thereto a transfer function

	which simulates the response of the vocal tract; (col.4, ll.53-63; col.14, ll.7-16) Gasper does not show: characterized in that the source module providing step comprises providing a source module including means for generating a succession of sound granule signals to constitute said raw sound signal, wherein the spectrum of the sound granule signals is controlled according to states of cells of a cellular automaton. Miranda teaches: means for generating a succession of sound granule signals to constitute raw sound signal (p.297, col.1, 1st ¶, ll.1-4) and means for controlling the spectrum (e.g., sine waves with frequency, amplitude, and duration) of the sound granule signals according to states of cells of a cellular automaton. (p.298, Fig.1; col.2, 2nd ¶) It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the voice synthesis apparatus of Gasper to include the means of granular synthesis of sounds based on cellular automaton in order to generate a wide range of complex sounds (p.299, col.1, 1st ¶; p.297, col.1, 1st ¶, ll.6-10). Since the voice synthesis apparatus of Gasper provides means to add desired inflection to the sound or voice samples (see Abstract), the combination of the arts would provide high-quality synthesized sound or voices.
Claim(s) 16	The combination of Gasper and Miranda shows: A method of synthesizing ultra-linguistic utterances according to claim 15, wherein a sound granule signal is generated by summing the signals (e.g., sine waves) produced by a plurality of signal generators (e.g., oscillators), the signal produced by each of the signal generators being dependent upon the state of one or more cells of the cellular automaton. (Miranda: p.298, col.3; Fig.1)
Claim(s) 17	The combination of Gasper and Miranda shows: A method of synthesizing ultra-linguistic utterances according to claim 16, wherein

	the waveform output by each signal generator (e.g., oscil1, oscil2, ..., oscil9) is selected from one of a plurality of different waveforms (e.g., sine waves). (Miranda: p.298, Fig.1)
Claim(s) 18	<u>The combination of Gasper and Miranda shows:</u> A method of synthesizing ultra-linguistic utterances according to claim 16, wherein the number of signal generators (e.g., oscillators) used for production of the sound granule signal spectrum is set to one of a plurality of different possible values (e.g., 9). (Miranda: p.298, col.2, last 5 lines)
Claim(s) 22	<u>The combination of Gasper and Miranda shows:</u> A method of synthesizing ultra-linguistic utterances according to claim 15, wherein the cells of the cellular automaton can take states corresponding to integer values from 0 to x-1 and, at each cycle in the evolution of the cellular automaton, the state of each cell is updated dependent upon the states of the nearest neighbors of said cell according to the following algorithm: $$m^{t+1} = int(A/r_1) + int(B/r_2) \qquad \text{if } m^t = 0$$ $$m^{t+1} = int((S/A) + k) \qquad \text{if } 0 < m^t < x\text{-}1$$ $$m^{t+1} = 0 \qquad \text{if } m^t = x\text{-}1$$ where m^{t+1} is the cell state at a time period t+1 (after updating), m^t is the cell state at time t (before updating), A and B represent, respectively, the number of cells taking state value x-1 and state values in the range 1 to x-2 amongst the eight nearest neighbors of this cell, S represents the sum of the nearest neighbors' states, r_1 and r_2 represent the cell's resistance to an increase in state value and k controls the rate of increase of state value. (Miranda: see p.298, col.1, "The Algorithm" section). *{m^t is equivalent to cell(n)$_t$, m^{t+1} eq. cell(n)$_{t+1}$, A eq. Pcells(n), B eq. Bcells(n), S eq. Pdegree(n)}*
Claim(s) 23	<u>The combination of Gasper and Miranda shows:</u> A method of synthesizing ultra-linguistic utterances according to claim 22, wherein each of the parameters r_1, r_2 (resistances) and k (capacitances) is dynamically set to a

	respective one of a plurality of different possible values. (Miranda: p.298, col.1, II.3-11; col.2, last 5 lines; col.3, II.1-2)
Claim(s) 24	The combination of Gasper and Miranda shows: A method of synthesizing ultra-linguistic utterances according to claim 15, wherein the dimensions of the cellular automaton (dimension of the grid) are dynamically set to one of a plurality of different possible values. (Miranda: p.298, col.1, II.3-11; col.2, last 5 lines)
Claim(s) 25	The combination of Gasper and Miranda shows: A method of synthesizing ultra-linguistic utterances according to claim 15, wherein the number of states (n) that can be assigned to the cells of the cellular automaton are dynamically set to one of a plurality of different possible values. (Miranda: p.298, col.1, II.3-5)
Claim(s) 26	The combination of Gasper and Miranda shows: A method of synthesizing ultra-linguistic utterances according to claim 15, wherein the duration of the individual sound granules is dynamically to one of a plurality of different possible values. (Miranda: p.298, col.3, II.10-15) *{The duration is set by the number of iterations.}*
Claim(s) 27	The combination of Gasper and Miranda shows: A method of synthesizing ultra-linguistic utterances according claim 15, wherein the total number of sound granules (i.e., number of iterations) making up the raw sound signal is dynamically set to one of a plurality of different possible values. (Miranda: p.298, col.3, 1st ¶)

Conclusion

3.   Claims 6-8 and 19-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4.   The following is a statement of reasons for the indication of allowable subject matter:

Claim(s)	
Claim(s) 6	The prior art fails to show: Voice synthesis apparatus according to claim 3, wherein the states of the cells of the cellular automaton are each associated with respective frequency and amplitude values.
Claim(s) 7	Allowable based on dependency.
Claim(s) 8	Allowable based on dependency.
Claim(s) 19	The prior art fails to show: A method of synthesizing ultra-linguistic utterances according to claim 16, wherein the states of the cells of the cellular automaton are each associated with respective frequency and amplitude values.
Claim(s) 20	Allowable based on dependency.
Claim(s) 21	Allowable based on dependency.

Conclusion

5.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

[1] Vaidhyanathan, S., "CA: A system for granular processing of sound using cellular automata," Proc. 2nd COST G-6 Workshop on Digial Audio (DAFx99) 1999, NTNU, Trondheim, pp.W99-1 to W99-5, December 9-11, 1999.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tim Lao whose telephone number is 703-305-8955. The examiner can normally be reached on M-F, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on 703-305-4827. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tim Lao
Examiner
Art Unit 2655

TL
07/08/04

W. R. YOUNG
PRIMARY EXAMINER